

### **Abstract**

A vented abrasive water-jet nozzle including a nozzle body having an abrasive-material mixing cavity, a receiving portion having receiving surface that receives a vented water-jet forming assembly, and an airflow restriction  
5 orifice between the receiving portion and the abrasive-material mixing cavity defining a water-jet pathway. The nozzle also includes an air-vent inlet port, and an air-vent pathway coupled between the air-inlet port and the water-jet pathway. A vented water-jet forming assembly includes a body having two spaced-apart surfaces, the first surface including a portion that receives a high-pressure water  
10 source, and the second surface including a portion that engages a receiving surface of an abrasive water-jet nozzle, and a jewel having a water-jet forming orifice carried on the receiving portion of the first surface. The assembly also includes a bore, and an air-vent pathway, the bore coupling the orifice and the  
15 air-vent pathway.